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# SEAT BELT USE RATES IN WASHINGTON STATE, 2006

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It is both a national and a Washington state priority to encourage the use of seat belts by motor vehicle occupants. Dramatic increases in belt use have been achieved through the enactment of mandatory use laws, enforcement and public education/information. Washington state enacted a secondary enforcement seat belt law in 1986, and since then annual observation surveys of belt use have been conducted in order to assess changes in the rates of belt use in Washington. The most recent seat belt survey was completed in July 2006. The purpose of this report is to document the survey methods and procedures and to report the survey findings.

## **SURVEY METHODS**

### Survey Design and Observation Sites.

A consulting firm, WESTAT Inc., designed the survey methodology under a contract with NHTSA. This design provides a statistical estimate of the overall statewide belt use rate. WESTAT conducted the early surveys from 1986 to 1989, and WTSC staff and contractors have conducted all subsequent surveys. The WESTAT design and methodology has been used for all surveys.

The roadways selected for inclusion in the WESTAT sample represent a probability sample of all road segments in the state. All 39 counties in Washington were eligible for selection in the sample. A total of 18 counties were selected, nine from western Washington and nine from eastern Washington. The three most populous counties in each half of the state were first selected with certainty, and then six additional counties from each half of the state were selected with a probability that was proportional to the vehicle miles of travel (VMT) in each county. Roadways were grouped into major roads (state routes and interstate highways) and local roads (city streets and county roads). Road segments were clustered within sample counties and census tracts and then randomly selected with a probability proportional to VMT. A detailed description of the sampling and survey methodology can be found in the first WESTAT report (WESTAT, 1986).

A few of the sites selected for the original WESTAT sample no longer exist or could not be observed from a safe vantage point; these sites have been replaced by other similar roads located as near as possible to the original site. Also, a 19<sup>th</sup> county, Franklin County, was added to the sample in order to increase the number of observations in communities with significant Hispanic populations. The sampling weights for this county were set equal to one in order to not distort the weighted estimate of statewide belt use.

The sample includes 402 roadway sites. The survey design specifies the precise location for each observation site, including the direction of travel to be observed.

Sites are grouped in clusters based on geographic proximity in order to minimize the observer's travel time. Clusters are randomly assigned to days of the week, and sites are randomly sequenced within each cluster. All seven days of the week are included in the sample.

The sample design complies with NHTSA survey guidelines specified in 1998 NHTSA rules. Four different types of vehicles are observed during four separate data collection periods at each of the roadway sites. The four vehicle types are passenger cars (including station wagons), pickup trucks, sport utility vehicles (SUVs), and passenger vans. Seat belt use is observed and tallied separately for drivers and right-front passengers.

#### Observation Procedures.

Trained observers, many of whom are retired police officers, collected the survey data. The survey coordinator, also a retired police officer, trained and monitored the observers.

Each roadway site was observed for 80 minutes, 20 minutes for each of the four types of vehicles. The survey personnel typically observe 5 sites per day between the hours of 8 AM and 5 PM. Thus, the survey results can only be generalized to daytime hours. The roadways were observed from the shoulder or a sidewalk adjacent to the road or, if possible, from an overpass. Safety of the observers was a primary consideration in choosing the vantage points.

Survey personnel were instructed to observe shoulder belt use of drivers and right-front seat passengers. Observation of lap belt use or passengers in other seating positions was impossible due to the fact that vehicles were observed in moving traffic at speeds ranging from 20 mph to 70 mph.

Traffic was observed in one direction of travel only, and the direction was specified in the sampling plan. On multi-lane roads, survey personnel were instructed to observe only as many lanes of traffic as was feasible based on traffic flow and vehicle speeds. For example, on a 4-lane interstate highway only 2 or 3 lanes will typically be observed. The number of lanes of travel and the number of lanes actually observed were recorded on the data collection sheet.

Belt use was recorded using a counting device with four separate counters. One of the counters was incremented for each driver seen using a shoulder belt, and a second counter was incremented for each driver seen not using a belt. Passenger belt use was recorded similarly on the third and fourth counters.

Misuse of shoulder belts, such as wearing them under the arm, was counted as "not using the belt". Cases where the observer was "unsure" were excluded

from the analysis. These cases typically result from sun glare or tinted windows on a vehicle. In 1999 and subsequent surveys, the WTSC modified the procedure for counting cases where the observer was unsure about belt use. In previous years, "unsure" observations were counted as "not using" belts.

At the end of each 20-minute observation period, the counter totals were entered on a data collection form. Additional data elements entered on the form were the site identification number, county, date, approximate vehicle speeds (20, 40, or 60 mph), time of day, the number of lanes in the direction of travel observed, and the number of lanes actually observed.

In addition to seat belts, observations were also made of motorcycle helmet use. Observations were classified into three categories: helmets that appeared to be "approved" by USDOT, those that appeared to be "non-approved", e.g., skull caps made of thin plastic material, and no helmet.

#### Rate Estimation Procedure.

The belt use rates computed from the survey data are weighted estimates of the amount of time on the road that vehicle occupants were seen using belts divided by the total time occupants were observed. The ratio of belted occupants to total occupants was adjusted by an estimate of vehicle time on the road for each road site. Time on the road was computed by the length of the road segment divided by the approximate speed of the vehicles observed. The estimates were also adjusted by a ratio of the actual number of lanes observed divided by the total number of lanes in that direction of travel.

Finally, the rate estimates were adjusted based upon the sampling probability factor for each site. That is, each site was weighted by its probability of having been selected for inclusion in the sample of roadway sites. The formula used to estimate belt usage is described in detail in the WESTAT report (1986).

The WESTAT report also gives a brief description of the procedures used to compute the weighted variance and standard error of the estimate. However, since the WESTAT variance computation software was not available, the standard error of the estimate used for this report is based upon a simple unweighted between-site variance calculation.

## RESULTS

A total of 105,720 vehicle occupants, consisting of 76,696 drivers and 29,024 passengers, were observed either using or not using shoulder belts. Table 1 shows the weighted use rates for the 2006 Washington State seat belt observation survey by type of vehicle. The overall rate for all vehicles and occupants was 96.31% with a 95 percent confidence interval of +/- 0.82%.

Comparison of the different types of vehicles showed the highest rates for passenger cars and SUVs. It should be noted that the 94.78% rate for pickup trucks was not substantially lower than the rates for passenger vehicles; in years prior to the primary seat belt law rates for pickup trucks were up to 10% lower than other vehicles. Drivers had a higher use rate than passengers (96.73% vs. 95.18%).

**TABLE 1. SEAT BELT USE RATES BY TYPE OF VEHICLE, WASHINGTON STATE, 2006.**

TYPE OF VEHICLE	NUMBER OF OBSERVATIONS	RATE
PASSENGER CARS	51,213	96.93%
PICKUP TRUCKS	19,791	94.78%
SPORT UTILITY VEHICLES	22,260	96.95%
VANS	12,456	95.14%
STATEWIDE TOTAL	105,720	96.31%

Analysis of belt use by type of road showed a substantially lower use rate on city streets, 91.19%, compared to interstate highways at 97.55%. Table 2 shows these data.

Additional analyses examined belt use by vehicle speeds. Belt use was lowest when vehicles were traveling at lower speeds, 91.43%, compared to 93.69% for medium speeds and 97.04% at higher speeds. These data are entirely consistent with the rates by type of road.

**TABLE 2. SEAT BELT USE RATES BY TYPE OF ROAD,  
WASHINGTON STATE, 2006**

TYPE OF ROAD		RATE
US ROUTES		95.33%
INTERSTATES		97.55%
STATE ROUTES		95.79%
COUNTY ROADS		93.05%
CITY STREETS		91.19%
STATEWIDE TOTAL		96.31%

Belt use rates for the counties in the sample are shown in Table 3. Variability among the counties in seat belt use is evident in these data, ranging from 88% to 99%. It should be noted that the rates in the table may not be representative of the true rates in the sample counties. The survey sample was designed to give a statistically valid estimate of the STATEWIDE belt use rate, not for individual counties. Some of the sample counties include an over-representation of higher speed Interstate highway sites, while lower speed city streets and rural roads are over-represented in other counties.

**TABLE 3. SEAT BELT USE RATES BY COUNTY,  
WASHINGTON STATE, 2006**

County	Rate
CLALLAM	98.92%
CLARK	98.70%
COWLITZ	97.96%
FRANKLIN	94.76%
GRANT	95.24%
KING	97.39%
KITTITAS	97.36%
KLICKITAT	93.77%
LINCOLN	88.44%
MASON	97.58%
PIERCE	93.86%
SNOHOMISH	94.68%
SPOKANE	93.41%
STEVENS	92.86%

<b>THURSTON</b>	<b>94.47%</b>
<b>WALLA WALLA</b>	<b>95.50%</b>
<b>WHATCOM</b>	<b>95.24%</b>
<b>WHITMAN</b>	<b>90.14%</b>
<b>YAKIMA</b>	<b>95.97%</b>
<b>Total</b>	<b>96.31%</b>

A total of 1,994 motorcyclists were observed during the survey, and the overall helmet use rate was 99.65%. However, a substantial number were wearing unapproved helmets, 255 or 12.79%. The rate for unapproved helmets in last year's survey was 11.5%, with an overall rate of 100%.

## **DISCUSSION**

Table 4 shows belt use rates for all previous surveys from 1986 to 2006. Seat belt use in Washington State has shown a fairly consistent trend of improvement. The rates more than doubled following implementation of the secondary enforcement law, from 36% in 1986 to 80% in 1995. However, little change was seen between 1995 and 2001. The rates in Washington under the secondary law were among the highest reported by other secondary law states.

In 2002, belt use increased to 93%. Changes in law, policy, and programs implemented in 2002 had a dramatic influence on belt use rates. These changes included:

- The primary enforcement law enacted in June 2002,
- The Chief of the Washington State Patrol made seat belt enforcement one of the core missions of the agency, and
- Washington State participated in the national Memorial Day "Click it or Ticket" program during May/June 2002.

Washington has been able to maintain a high rate of belt use (above 90%) in recent years by continuing programs of enhanced enforcement coupled with public information and education efforts. These programs include the following:

- Continuing waves of Click it or Ticket mobilizations; two waves per year.
- Road signs (650 throughout the state) that constantly remind the public that the seat belt law is enforced and that the fine is expensive (\$101).
- Incentive programs for local law enforcement agencies that encourage continuing enforcement of the seat belt law.
- Targeting enforcement efforts to areas with lower rates of belt use.

A recent paper by Salzberg and Moffat (2004) describes these programs in detail.

The 96.3% rate in Washington for 2006 is the highest seat belt use rate ever reported by a state.

**TABLE 4. WASHINGTON STATE SEAT BELT USE RATES, 1986 TO 2006.**

<b>DATE</b>	<b>BELT USE RATE</b>
October 1986	36 %
March 1987	51 %
October 1987	52 %
April 1988	53 %
May 1989	55 %
May 1991	66 %
September 1991	69 %
May 1992	68 %
September 1992	67 %
June 1993	69 %
October 1993	73 %
June 1994	76 %
September 1994	77 %
June 1995	80 %
May 1996	81 %
June 1997	78 %
July 1998	79 %
August 1999	81 %
August 2000	82 %
August 2001	83 %
June 2002	91 %
September 2002	93 %
July 2003	95 %
July 2004	94%
June 2005	95 %
July 2006	96 %



## REFERENCES

WESTAT, Inc. Washington State Observational Survey of Safety Belt Usage.  
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